CONCLUSION

Of the Department of the theory of mechanisms, machines, and mechanics of robots at the All-Union Machine-Building Institute in correspondence regarding a gearbox proposed by Mr. Abramov V. F.

After hearing a report presented by Mr. Abramov V. F. regarding the proposed gearbox for a combine (harvesting machine) of the "Don" family and its comparison with the introduced gearbox 3518020–42020 with a mechanical drive, the Department noted:

1. The two gearboxes (being proposed and existing) have been designed to work in the identical conditions and at the same transmitting power with usage of the same material.

2. The gearbox being proposed now has the same number of speed gears forward (4) and an extra reverse gear (two instead of one); ranges of gear ratios can be performed practically the same.

3. The gearbox being proposed now with a comparison with the existing one has lesser number of cogwheels (9 instead of 13), bearings (8 instead of 12) and shafts (3 instead of 4); and all its gears are located in one case (without an additional case as is in the existing gearbox).

At the same shifting power most cog gears in the proposed gearbox are subject to expose to lesser force and at the same modules and sizes have greater reserve for duration in comparison with the existing gearbox.

4. Control elements of both gearboxes can be performed approximately the same, since in one and in the other gearbox the shifting process is implemented by the three movable blocks of pinions.

Taking into account the noted above advantages of the proposed gearbox at the other equal conditions and characteristics, consider that the developed construction is perspective and it should be recommended to manufacture an experimental model for future stand (laboratory) and field tests.

Chief of the Department of the Theory of Mechanisms, Machines, and Mechanics of Robots (All-Union Machine-Building Institute)
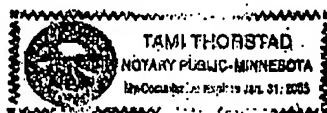Doctor of Technical Science, Professor

O.I. Kulbachnyy
March, 11, 1988

I hereby certify that the above translation is an accurate and complete rendering of the original document (Conclusion of the Department of the Theory of Mechanisms, Machines, and Mechanics of Robots) from Russian into English and was done to the best of my knowledge. If you have any questions regarding this translation, please contact me at (763) 424-2816 or (612) 618-6642

Translated by Vladimir Chlobkayle
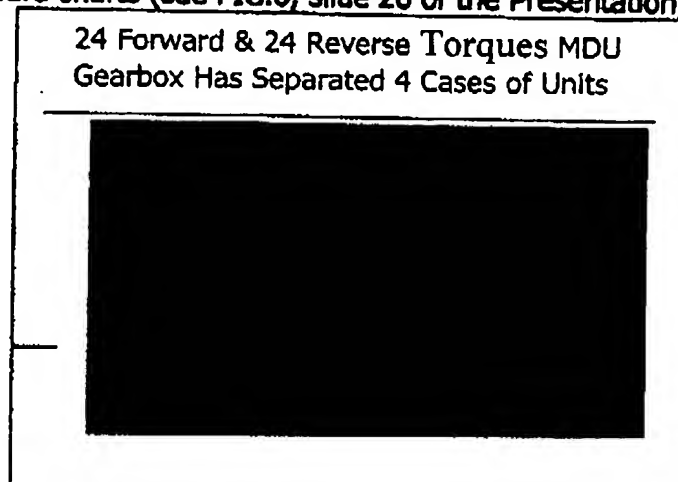Court and Legal Interpreter (Minnesota State Rostary) Certified Medical Interpreter (Washington State)

State Minnesota,   County Hennepin
City Brooklyn Park

Subscribed and sworn to before me this 20 day of December 200 3.
Notary Public

SEAL

3. A revolutionary technology creates also gearbox designs comprising multi-cases. There is each unit or group of units has case connected one to another by extended outward shafts (see FIG.6, slide 26 of the Presentation)

24 Forward & 24 Reverse Torques MDU Gearbox Has Separated 4 Cases of Units

4. Unbelievable – believable number of torques or unlimited high-torque significance.

A revolutionary technology of gearbox designs could create transmission produces unbelievable – believable number of speed or unlimited high-torque. There is enclosed diagram of gearbox of 108=3x3x3x4 forward and 36 reverse torques.

The numbers of designs, units, gears, shafts in formula:

108=3x3x3x4. There are more than 24 designs with 4 units, 5 shafts, and (3+3+3+4) x 2-1=25 gears for forward speeds and 3 gears for reverse speeds. Total: 28 gears.

<u>The defined gear ratios for all gearsets in each unit:</u>

MDU gearbox of 108=3x3x3x4 designs :
1. First unit has 3 gear ratios : $1, 1/R^{36}, 1/R^{72}$ or $R^{36}, 1, 1/R^{36}$
2. Second unit has 3 gear ratios : $1, 1/R^{12}, 1/R^{24}$
3. Third unit has 3 gear ratios : $1, 1/R^4, 1/R^8$ or $1/R^{16}, 1/R^{20}, 1/R^{24}$
4. Fourth unit has 4 gear ratios : $1, 1/R, 1/R^2, 1/R^3$ or $1/R^{20}, 1/R^{21}, 1/R^{22}, 1/R^{23}$

The biggest gear ratio is $1/R^{36} = 1.05^{36} = 5.9$. The size of gearwheel of gearset is not excessive.